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# PATENT ABSTRACTS OF JAPAN

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LTD

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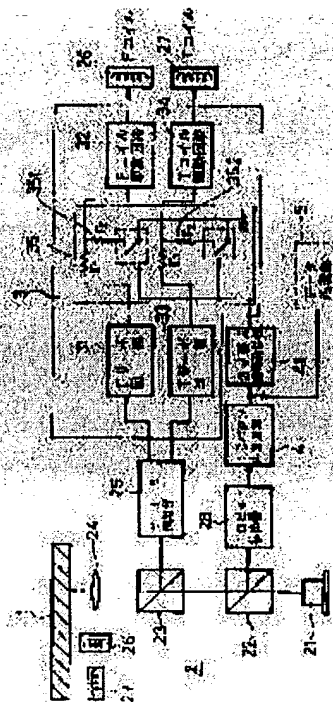
(72)Inventor : TSUTSUI TADAHIKO

## (54) SYSTEM FOR STABILIZING SERVO OF OPTICAL HEAD

### (57)Abstract:

**PURPOSE:** To reduce the adverse influence of ID pit noise with respect to a servo error signal and to stabilize servo by providing attenuation circuits having switch function for the control part of a magneto-optical disk device or a magneto-optical evaluation device.

**CONSTITUTION:** When an optical head 2 reads an ID part, an ID pit detector 28 detects an ID pit. An ID pit signal is inputted to an ID pattern reproduction circuit 4 and an ID pattern is reproduced. It is inputted to a switch signal generator 41 and a switch signal is generated. It is supplied to the respective switches of the attenuation circuits 351 and 352. The contact points of the respective switches are closed by the switch signal, and an F-error signal and a T-error signal are attenuated to appropriate levels. The influence of ID pit noise is reduced and the both error signals are stabilized.



## LEGAL STATUS

[Date of request for examination]

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CLAIMS

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[Claim(s)]

[Claim 1] As opposed to the magneto-optic disk with which the track slot for servoes and ID pit to the ID section were preformatted The servo error detection machine which reads this track slot by the optical head, and detects a focal error and a tracking error, In the optical-magnetic disc equipment which has the control section which controls the focus and tracking of this optical head by the servo error signal which this detector outputs, or magneto-optic-disk assessment equipment Prepare the attenuation circuit which changes to this control section and has a function, and ID pattern is detected from ID pit signal by which read-out is carried out with said track slot. A servo error signal [ in / a signal is made, and this change signal is given to said attenuation circuit, and it changes / it changes from detected this ID pattern, and / to an attenuation side, and / said ID section ], The servo stabilization method of the optical head which decreases ID pit noise contained in this on suitable level, and is characterized by stabilizing said servo error signal.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the method which stabilizes the servo function of the optical head in optical-magnetic disc equipment or magneto-optic-disk assessment equipment.

[0002]

[Description of the Prior Art] Development is furthered as a high density medium which can rewrite information data, optical-magnetic disc equipment is equipped with a magneto-optic disk, and it is used for record of data. Moreover, assessment equipment is developed in order to evaluate the record engine performance of a magneto-optic disk.

[0003] Drawing 2 explains the record approach of a magneto-optic disk and the data to this. Drawing 2 (a) Setting, 1 shows a magneto-optic disk (or it is only called a disk), and 2 shows an optical head. Many truck slots G are \*\*\*\*(ed) by the disk 1 for the servoes of the focus of the optical head 2, and tracking, and each truck slot G is the sector S0 of plurality [ circumferencial direction ] - Sm with an index (IND) as the starting point. It is classified. In each sector, it is (b). The ID section and the DATA section are prepared so that it may be shown, the identification information to a sector number etc. is recorded on the ID section by the pit, and data are magnetically recorded on the DATA section by the optical head 2. In a fabrication of a magneto-optic disk, the truck slot G is first \*\*\*\*(ed) by etching to original recording, La Stampa is made by nickel plating from original recording, and many disks are reproduced from this. Although rewriting of data is possible for a magneto-optic disk, since it is unnecessary in rewriting, the ID section is beforehand written in as a PURIHO mat with the truck slot G in the phase of original recording, and is imprinted by the magneto-optic disk through La Stampa. Drawing 2 (c) The PURIHO mat set as La Stampa is shown, ID pit shown by O mark is recorded on the ID section of the truck slot G, and magnetization of x mark has shown the data recorded in optical-magnetic disc equipment to the DATA section.

[0004] Drawing 3 explains the servo approach of the optical head 2 in optical-magnetic disc equipment or magneto-optic-disk assessment equipment. Drawing 3 (a) Setting, the spindle which is not illustrated is equipped with a disk 1 and it rotates. About the laser beam outputted from the light source 21 of the optical head 2, they are two beam splitters 22 and 23. It passes and projects on a disk 1 with an objective lens 24. The reflected light is condensed with an objective lens 24, and they are beam splitters 23 and 22. It divides and inputs into the servo error detection machine 25 and ID pit detector 28, respectively. Below, for convenience, F shows a focus and T shows tracking. In the servo error detection machine 25, F error and T error of the optical head 2 are detected, F error signal is inputted into F coil actuation circuit 32 through F servo circuit 31, the F coil 26 is operated according to the actuation current, and the optical head 2 follows a right F location. Similarly, T error signal operates the T coil 27 by T servo circuit 33 and T coil actuation circuit 34, and the optical head 2 follows a right T location. In addition, ID pit is detected in ID pit detector 28, ID pit signal inputs into the ID section regenerative circuit 4, ID pattern is reproduced, this is decoded by the data-processing section 5, and it is used for access of the data to the DATA section. Or in the case of magneto-optic-disk assessment equipment, assessment is

made for the quality of ID pattern etc.

[0005] When the detection approach of the above-mentioned F error and T error is described, in the servo error detection machine 25, it is drawing 3 (b). Shown quadrisection electric eye 251 (c) Shown 2 division electric eye 252 It is prepared. (b) \*\* quadrisection electric eye 251 The focus of an objective lens 24 is (\*\*) at the time of the right. Although the light income of each component is uniform, when a laser spot is [ like ] circular, and a focus shifts to the front or back, it is (\*\*) by the aberration of an objective lens 24. In or (Ha), a laser spot deforms into an ellipse like and the light income of each component carries out imbalance. This amount of imbalance is detected and F error signal is outputted. Next, (c) 2 division electric eye 252 It is (b), when it is almost the same and tracking is in agreement with the core of the truck slot G. Like, although a circular laser spot is received by both components at homogeneity, if it separates from the core of the truck slot G, since the light income of both components will carry out imbalance, this is detected and T error signal is outputted.

[0006]

[Problem(s) to be Solved by the Invention] now, said time of ID pit being preformatted into the magneto-optic disk, and projecting a laser beam on a disk, as carried out -- the truck slot G -- \*\* -- the reflected light is reflected also from ID pit and both the reflected lights of both are inputted into the servo error detection machine 25. Since a location changes according to ID information, ID pits are both the electric eyes 251, 252. It becomes a noise to each component, and light income is changed, F error signal and T error signal become unstable, and the servo of the optical head 2 is not carried out to accuracy. However, since a pit is not formed in the DATA section, the light income of each component should not be changed. However, the servo instability in the ID section drags on to the DATA section, and it carries out trouble to read-out of data. The effective cure is needed to the servo instability by such ID pit noise. This invention was made in view of the above, mitigates the adverse effect of ID pit noise to a servo error signal in the servo of the optical head in optical-magnetic disc equipment or magneto-optic-disk assessment equipment, and aims at offering the method which stabilizes a servo.

[0007]

[Means for Solving the Problem] This invention is the servo stabilization method of an optical head, and prepares the attenuation circuit which has a change function in the control section of the above-mentioned optical-magnetic disc equipment or magneto-optic-disk assessment equipment. ID pit signal read with a truck slot detects ID pattern. It changes from ID pattern, and a signal is made, this changes to an attenuation circuit attenuation-side, the servo error signal in the ID section and ID pit noise contained in this are decreased on suitable level, and a servo error signal is stabilized.

[0008]

[Function] Reading appearance of the truck slot and ID pit of the ID section is carried out by the optical head, in a control section, a servo error signal is created from a truck slot, and ID pit signal included in this serves as [ in / both / the above-mentioned position control stabilization method ] a noise. On the other hand, if it changes with ID pattern detected from ID pit signal, and a signal is made and this changes an attenuation circuit to an attenuation side, the servo error signal and ID pit noise in the ID section will be decreased on suitable level. In this case, if ID pit noise is disappeared thoroughly, since a servo error signal will also be decreased beyond the need and will not be useful, both are decreased on suitable level so that this may be useful and ID pit noise may not influence. Since former one is quite larger than the latter here when the size of a truck slot and ID pit is compared, both S/N is good to some extent, and the suitable above-mentioned level can be decided by experiment. The adverse effect of ID pit is mitigated by the above, a servo error signal is stable, the effect to the DATA section following the ID section is eliminated, the servo of an optical head becomes exact, and access of data is made good.

[0009]

[Example] Drawing 1 shows the block diagram to one example of this invention. The block configuration of drawing 1 is above mentioned drawing 3 (a). They are two attenuation circuits 351, 352 in which it is almost the same and a point of difference has a changeover switch to the control section 3 of drawing 1, respectively. The becoming attenuation section 35 is added. Each attenuation circuit is series resistance  $r1$ . Parallel resistance  $r2$  It becomes, and when the contact of a switch closes, it is

constituted so that the magnitude of attenuation may increase. Furthermore, it changes to the output side of ID pattern regenerative circuit 4, a signal generator 41 is formed, and they are both the attenuation circuits 351,352 about this. It connects with each switch. In addition, it sets to drawing 1 and is drawing 3 (a). Let the same element be the same number.

[0010] Hereafter, actuation of the above-mentioned block configuration is explained. The laser beam which a disk 1 rotates with a spindle and is outputted from the light source 21 of the optical head 2 Two beam splitters 22 and 23 It passes, and projects to a disk 1 with an objective lens 24, the reflected light is condensed with an objective lens 24, and they are beam splitters 23 and 22. Servo error detection machine 25, It is above mentioned drawing 3 (a) that input into ID pit detector 28, respectively, and F error and T error of the optical head 2 are detected. It is the same as that of a case. Detected F error signal passes through F servo circuit 31, and is an attenuation circuit 351. T error signal passes through T servo circuit 33, and is an attenuation circuit 352. It inputs, respectively. ID pit detector 28 detects ID pit, ID pit signal inputs into ID pattern regenerative circuit 4, ID pattern is reproduced, this changes, on the other hand, when the optical head 2 reads the ID section, it inputs into a signal generator 41, and changes, and a signal occurs, and it is an attenuation circuit 351,352. Each switch is supplied. The contact of each switch closes with a change signal, F error signal and T error signal are decreased on suitable level, respectively, the effect of ID pit noise is mitigated by the above mentioned place, and both error signals are stabilized. Both error signals are inputted into F coil actuation circuit 32 and T coil actuation circuit 34, respectively, the F coil 26 and the T coil 27 operate by these actuation, the servo of the optical head 2 is carried out to accuracy, and a right focus and tracking are made. Thus, the optical head 2 by which the servo was carried out to accuracy shifts to the DATA section by revolution of a disk 1, an exact servo is continued, and access of data is performed good.

[0011]

[Effect of the Invention] In the servo stabilization method of the optical head according to this invention as the above explanation In the case of read-out of the track slot for servoes, the adverse effect of ID pit noise is mitigated and a servo error signal is stabilized. It is that by which the effect to the DATA section following the ID section is eliminated, the focus of an optical head and the servo of tracking become exact, and access of data is made good. The place which contributes to the servo technique of the optical head in optical-magnetic disc equipment or magneto-optic-disk assessment equipment is large.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block block diagram in one example of this invention is shown.

[Drawing 2] (a) The truck slot for servoes set as \*\*\*\*\*, the block diagram of a sector, and (b) The development view of a sector, and (c) The development view of a truck slot is shown.

[Drawing 3] (a) The block block diagram and (b) to the servo system of \*\*\*\*\* The explanatory view of the focal error detection approach, and (c) It is the explanatory view of the tracking error detection approach.

[Description of Notations]

1 [ -- Beam splitter, ] -- A magneto-optic disk, 2 -- An optical head, 21 -- 22 The light source and 23 24 -  
 - An objective lens, 25 -- A servo error detection machine, 26 -- A focal (F) coil, 27 -- A tracking (T)  
 coil, 28 -- ID pit detector, 3 -- Control section, 31 -- (Focus F) servo circuit, 32 -- (Focus F) coil  
 actuation circuit, 33 [ -- / -- A change signal generator, 5 / -- The data-processing section, G / -- A truck  
 slot, and S1 - Sm / -- Sector. / An attenuation circuit, 4 -- ID pattern regenerative circuit 41 ] --  
 (Tracking T) servo circuit, 34 -- (Tracking T) coil actuation circuit, 35 -- The attenuation section and  
 351,352

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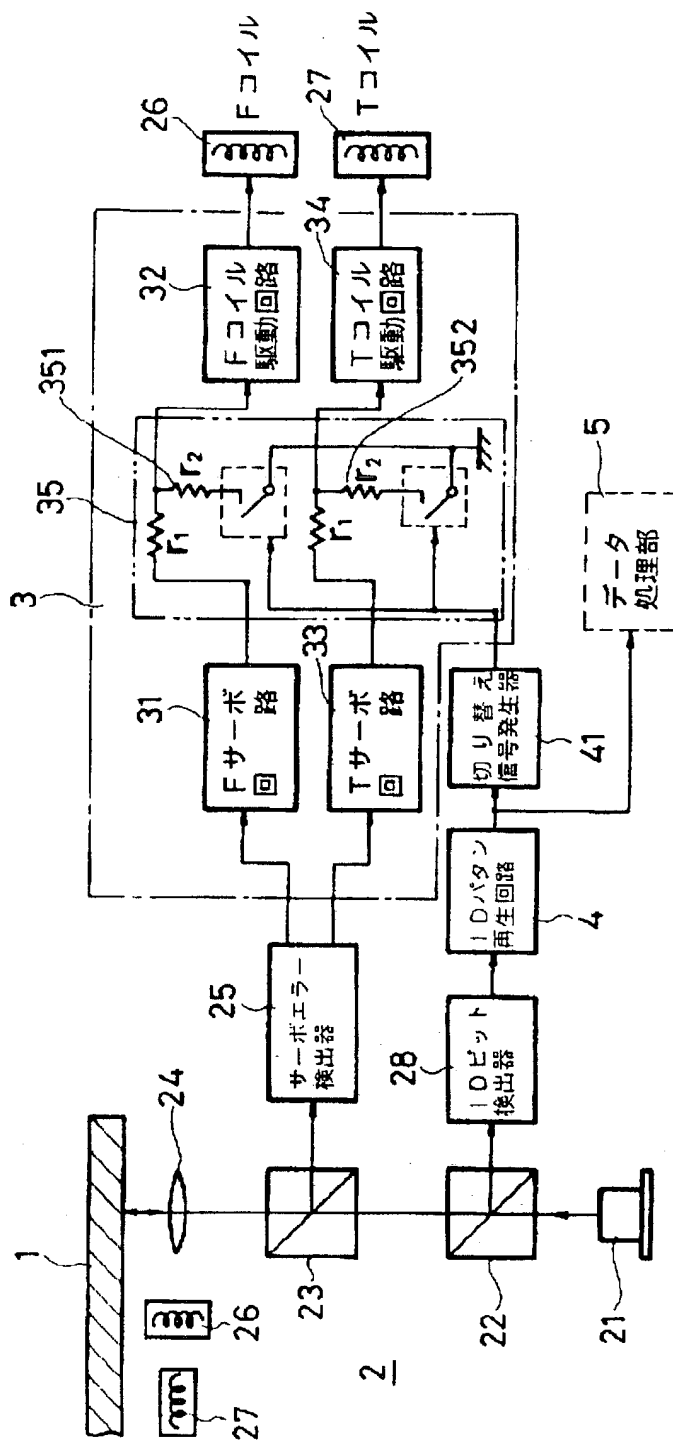
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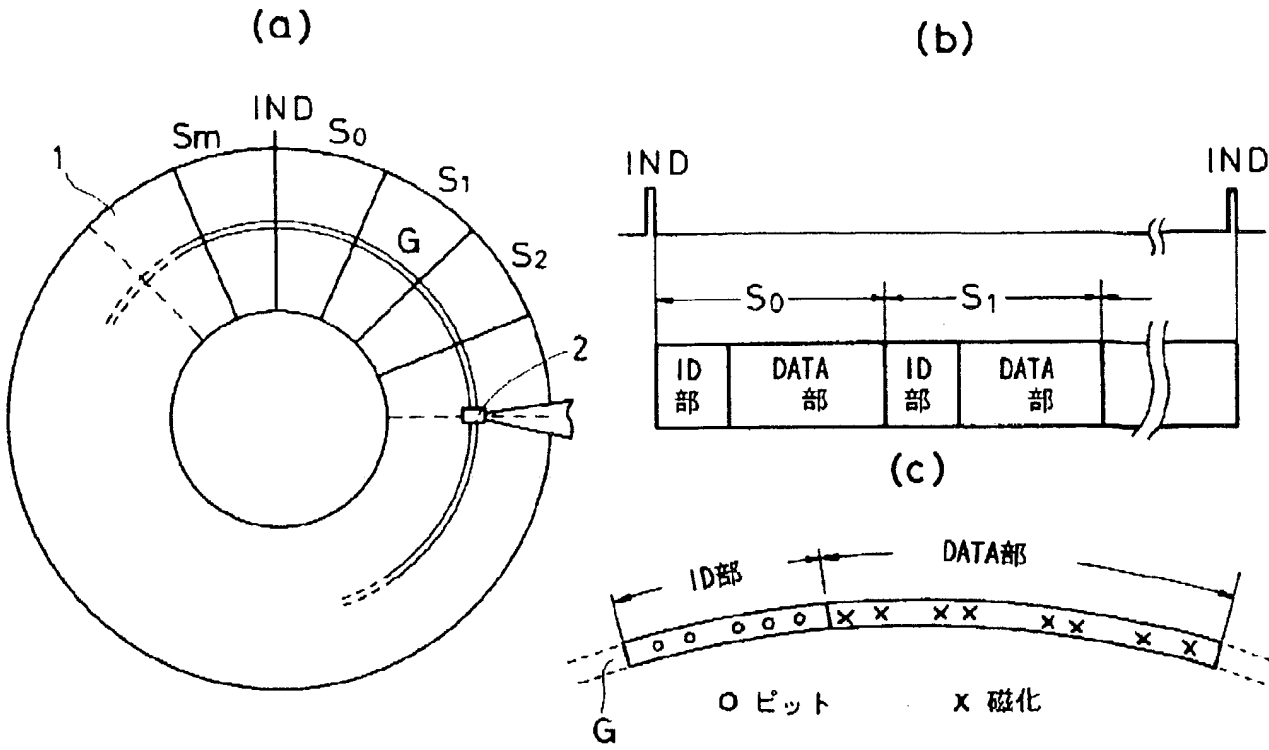
DRAWINGS

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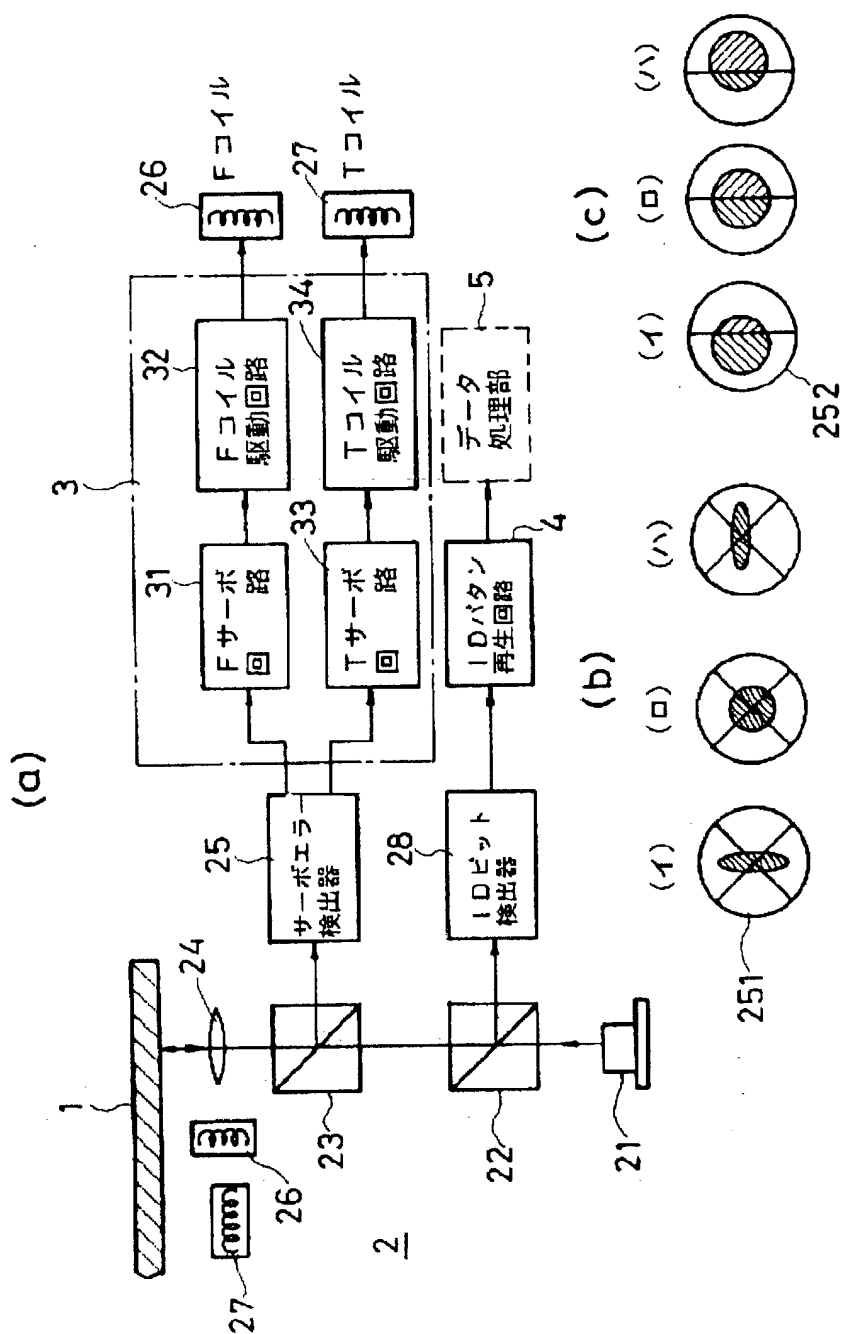
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]